

## Claims

What is claimed is:

- 1           1.     A method for implementing packet ordering in a network  
2     processor comprising the steps of:  
3         receiving packets and placing said received packets on a receive  
4     queue and providing a queue entry for each said received packet; said  
5     queue entry including for each autoroute packet, an autoroute indication and  
6     a selected transmit queue;  
7         providing an associated ordering queue with said receive queue;  
8         dequeuing a software-handled packet from said receive queue and  
9     placing said dequeued software-handled packet on said ordering queue; and  
10        automatically moving each said autoroute packet reaching a head of  
11     said receive queue to said selected ordering queue.
- 1           2.     A method for implementing packet ordering as recited in claim  
2     1 further includes the steps of:  
3         enqueueing a software-handled packet from said ordering queue to a  
4     transmit queue; and  
5         automatically moving each said autoroute packet reaching a head of  
6     said ordering queue to said selected transmit queue.
- 1           3.     A method for implementing packet ordering as recited in claim  
2     1 wherein the step of providing a queue entry for said received packets; said  
3     queue entry including for each autoroute packet, said autoroute indication  
4     and said selected transmit queue includes the step of identifying said  
5     selected transmit queue by dataflow assist hardware without software  
6     intervention.
- 1           4.     A method for implementing packet ordering as recited in claim  
2     1 wherein the step of dequeuing a software-handled packet includes the  
3     step of identifying a pointer to said software-handled packet in a packet  
4     segment register.

1           5.     Apparatus for implementing packet ordering in a network  
2     processor comprising:  
3           a receive queue for receiving packets; said receive queue including a  
4     queue entry for each said received packet; said queue entry including for  
5     each autoroute packet, an autoroute indication and a selected transmit  
6     queue;  
7           an associated ordering queue with said receive queue;  
8           software for dequeuing a software-handled packet from said receive  
9     queue and placing said dequeued software-handled packet on said ordering  
10    queue; and  
11          dataflow assist hardware for automatically moving each said  
12    autoroute packet reaching a head of said receive queue to said selected  
13    ordering queue.

1           6.     Apparatus for implementing packet ordering as recited in claim  
2     5 further includes a transmit queue; and said software for enqueueing a  
3     software-handled packet from said ordering queue to said transmit queue;  
4     and said dataflow assist hardware for automatically moving each said  
5     autoroute packet reaching a head of said ordering queue to said selected  
6     transmit queue.

1           7.     Apparatus for implementing packet ordering as recited in claim  
2     5 wherein said dataflow assist hardware identifies said selected transmit  
3     queue for each said autoroute packet without software intervention.

1           8.     Apparatus for implementing packet ordering as recited in claim  
2     5 wherein said software for dequeuing said software-handled packet  
3     includes a pointer to said software-handled packet in a packet segment  
4     register.

1           9.     A computer program product for implementing packet ordering  
2     in a network processor system, said computer program product including a  
3     plurality of computer executable instructions stored on a computer readable  
4     medium, wherein said instructions, when executed by the network processor  
5     system, cause the network processor system to perform the steps of:  
6           providing a receive queue for receiving packets; said receive queue  
7     including a queue entry for each said received packet; said queue entry  
8     including for each autoroute packet, an autoroute indication and a selected  
9     transmit queue;  
10          providing an associated ordering queue with said receive queue;  
11          dequeuing a software-handled packet from said receive queue and  
12     placing said dequeued software-handled packet on said ordering queue; and  
13          automatically moving each said autoroute packet reaching a head of  
14     said receive queue to said selected ordering queue

1           10.    A computer program product for implementing packet ordering  
2     as recited in claim 9 includes the steps of: enqueueing a software-handled  
3     packet from said ordering queue to a transmit queue; and automatically  
4     moving each said autoroute packet reaching a head of said ordering queue  
5     to said selected transmit queue.

1           11.    A computer program product for implementing packet ordering  
2     as recited in claim 9 wherein the step of dequeuing a software-handled  
3     packet includes the step of identifying a pointer to said software-handled  
4     packet in a packet segment register.

1           12.    A computer program product for implementing packet ordering  
2     as recited in claim 9 includes the step of identifying said selected transmit  
3     queue by dataflow assist hardware without software intervention.